F A C T S H E E T

Risks Related to Air Quality

United States
Department of Energy
Grand Junction Projects Office

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This fact sheet explains the potential health hazards associated with air quality related to the removal and storage of mill tailings and other contaminated materials.

Background

From 1942 to 1960, uranium ore was processed at the Monticello mill in southeast Utah. When the mill was closed, approximately 2.3 million cubic yards of low-level radioactive mill tailings, contaminated soil, and other miscellaneous debris remained on the site.

The U.S. Department of Energy (DOE) Grand Junction Projects Office, in conjunction with the U.S. Environmental Protection Agency (EPA) and the State of Utah, is conducting the cleanup of the millsite and more than 400 area homes and businesses contaminated with mill tailings. The purpose of the cleanup is to minimize risks to the public and the environment from exposure to the tailings and the radon gas they produce.

During the operation of the Monticello uranium mill and for several years after it was shut down in 1960, many radioactive materials, including the mill tailings, were removed from the site and used in construction. Mill tailings were especially useful in masonry because of their fine, sandlike texture. The wind also spread the radioactive tailings off the millsite to adjacent land. More than 400 Monticello properties containing approximately 400,000 cubic yards of soil were contaminated with tailings and by-product materials from uranium ore processing.

Radon

Radon is a colorless, odorless gas that is present naturally at low levels in soil. Radon is a decay product of uranium mill tailings and uranium ore. If a person is exposed to the gas for a long period of time, radon can cause damage to lung tissue and can increase the risk of lung cancer. The greatest risk of exposure is in confined spaces, such as basements of homes, located on or near mill tailings. Radon is also a concern outdoors, but an individual's risk is less because radon concentrations are usually much lower.

The amount of radon that accumulates inside a building depends on how it was constructed, the occupants' living habits, the season of the year, and how much radon is in the soil below and around the building.

Radon concentrations indoors are measured with alpha-track monitors (see Figure 1). Three monitors are clipped to a stand (the whole unit is about the size of a small cup) and are placed in the lowest livable level of the building, usually the basement or first floor. Air goes through the holes in the top of the cup, then through a filter paper behind the holes. Inside the monitor is a piece of film, similar to photographic film. As radon decays in the air, it produces alpha particles that create microscopic tracks in the film. After 3 to 4 months, the monitor is returned to the manufacturer. The

Figure 1. Alpha-Track Monitors Measure Radon

Figure 2. Air Monitoring Stations Measure Dust Generated by Construction Activities at the Monticello Millsite

manufacturer removes the film and counts the number of tracks, which are directly proportional to the amount of radon present in the building.

An environmental radon monitoring program was initiated to measure radon outdoors in Monticello. DOE monitors radon levels with alpha-track monitors at 15 locations in and around Monticello. Radon levels exceed the EPA standard on the millsite, but drop below the standard at most off-site monitoring locations because of dilution. Radon levels will continue to be monitored until the tailings are transferred to the permanent repository.

After cleanup is completed, monitoring is also used to confirm that tailings contamination has been removed to acceptable levels. If remediation of a property is required, the radioactive materials are removed from the property and will ultimately be placed in a repository south of Monticello for disposal. The repository design includes a radon barrier to control the release of radon to within acceptable limits. In a few cases, elevated radon levels are related to natural causes, and radon levels cannot be lowered, except through special venting techniques.

Dust Control

Very fine particulate matter (with a size of less than 10 micrometers) is a component of dust that can be created during soil excavation and concrete demolition. EPA has determined that these fine particulates can pose a risk to human health if they become lodged deep in a person's lungs. The hazards associated with dust exposure depend on the amount and type of dust inhaled, duration of exposure, and the health condition of the person exposed. Over short periods of time, these fine particulates do not pose a serious human health concern. However, individuals exposed to these fine particulates for long periods of time can develop respiratory disease, sustain lung damage, and die prematurely. In response to this health concern, EPA has established a national air quality standard that limits dust emissions. Results of air sampling in and around Monticello show that the dust concentrations are below the EPA standard.

To protect public and worker health, DOE monitors and controls dust at its remedial action projects (see Figure 2). During construction of the repository, visible dust cannot exceed State of Utah standards. Dust emissions are not allowed during remedial action activities at Monticello homes and businesses or at the millsite. To control dust, DOE limits vehicle speeds and applies water spray and surfactants. Wind speed is monitored to ensure that dust generating activities are halted when wind speeds reach 40 miles per hour.